

# MOUNTAIN PINE BEETLE

## *Dendroctonus Ponderosae* Hopkins



### Life Stages and Development

The mountain pine beetle is a small black beetle, approximately 3/16 inch in length, that attacks and kills pine trees in large numbers. During its one-year life cycle it passes through egg, larval, pupal, and adult stages (Fig. 1).

into **adults**. Approximately one year after the initial attack, the new adults chew through the bark and fly to attack a new tree.

**As** the new adults emerge, they pick up spores of a blue stain fungus which they carry to the newly attacked trees. Once a new attack is started, the fungus grows into the

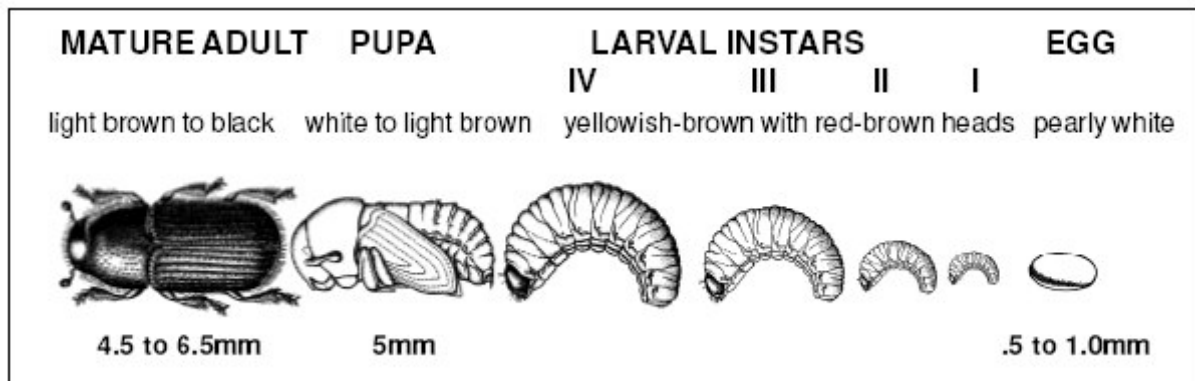


Figure 1. Life stages of the mountain pine beetle

All life stages are spent under the bark of infested trees except for a few weeks when adults emerge and fly to attack new trees during July and August. The adults bore through the outer bark, then chew out a fairly straight egg gallery, extending 10-30 inches up the tree in the soft inner bark (Fig. 2).

Pearl-white eggs about the size of a pin head are laid along the sides of the galleries and hatch in about two weeks. The **larvae** are legless, white and have small brown heads. They feed in the inner bark chewing out galleries that extend at right angles to the egg galleries (Fig. 2). The feeding continues until cold temperatures cause dormancy. The following June, when fully developed, the larvae change into **pupae**, which then develop

sapwood of the new tree, plugging up the moisture conduction system, and assisting in killing the tree.

### Signs of Attack

The first sign of infestation by the mountain pine beetle is the appearance of **pitch tubes**, 1/2 to 3/4 inch across, which usually form at the entrance holes in the bark during the summer of attack (Fig. 2). They are composed of pitch mixed with boring dust and are usually widely scattered over the trunk of the tree indicating a massive attack. The next symptom will be **fading needles** which turn from green to yellowish green, to red, and finally, approximately one year after the initial attack, to rusty brown.

# MOUNTAIN PINE BEETLE

## Hosts and Management Options

The main hosts of the mountain pine beetle are **lodgepole pine, ponderosa pine, and western white pine**. They also attack other pines including white-bark timber, Austrian and Scotch pines.

### Lodgepole Pine

Outbreaks in Lodgepole pine normally occur in mature to over-mature stands composed of bigger, older trees, at low elevations. Thus, storing these trees on the stump should be discouraged. Management plans for pine stands of this nature should include considerations for the mountain pine beetle.

Long-term management is best achieved by changing stand characteristics. Harvesting of susceptible lodgepole pine is the most efficient management tool. In Idaho, high risk stands are those that:

1. At an altitude of 5,800 to 6,500 feet or lower.
2. Have an average stand age of 80 years or older.
3. Have an average tree size of eight inches DBH or larger.
4. Have an inner bark thickness of one-tenth inch or greater.
5. When populations of beetles are already in the area, risk increases.

Reducing the average stand age or average tree size will reduce the overall susceptibility. This can be accomplished by harvesting or thinning operations. Patch cutting in lodgepole pine stands creates a variety of age classes that helps keep mountain pine beetle caused tree mortality low.

Short term control of the beetle is accomplished in two ways:

1. Synthetic reproductions of natural chemical messengers (pheromones) produced by the beetles can be used to attract and trap the mountain pine beetle. If a harvest is planned,

standing trees can be baited with pheromones, enticing the beetles to attack. After the attack, the trees can be cut and hauled from the site for processing which destroys the beetles.

2. Preventive sprays of pesticides can provide two years of protection where tree value warrants the treatment. Repellent pheromones are also being developed.

### Ponderosa Pine (Bull Pine)

In Idaho stands with a high potential for attack are 80 to 100 years old, single-storied, with an average diameter of ten inches DBH or greater, and are fairly dense. Stand density is often expressed in terms of **basal area** which is the sum of the cross-sectional area of all the trees on an acre. A basal area of 150 square feet or higher would be a high risk; 80 to 150 square feet, constitutes a medium risk; and less than 80 square feet is a low risk stand. As a general rule, a stand that has been thinned to 100 square feet of basal area per acre is considered to be fairly beetle resistant.

### Western White Pine

Attacks of the mountain pine beetle on western white pine may be correlated with the incidence of white pine blister rust. Beetle management is obtained through management of the blister rust. Heavily infected trees should be cut. Rating systems to determine the hazard to white pine from the blister rust are available and can serve as a guide for management of this tree.

### Protecting High Value Trees

For high value trees, such as those found in yards or recreation sites, the chemical pesticide carbaryl is registered and available to protect trees from attack. If there is a threat of attack of pines by the mountain pine beetle, carbaryl (Sevin®) can be applied before the beetles attack, protecting the trees for up to two years. The spray should be applied according to label instructions.

## ***MOUNTAIN PINE BEETLE***

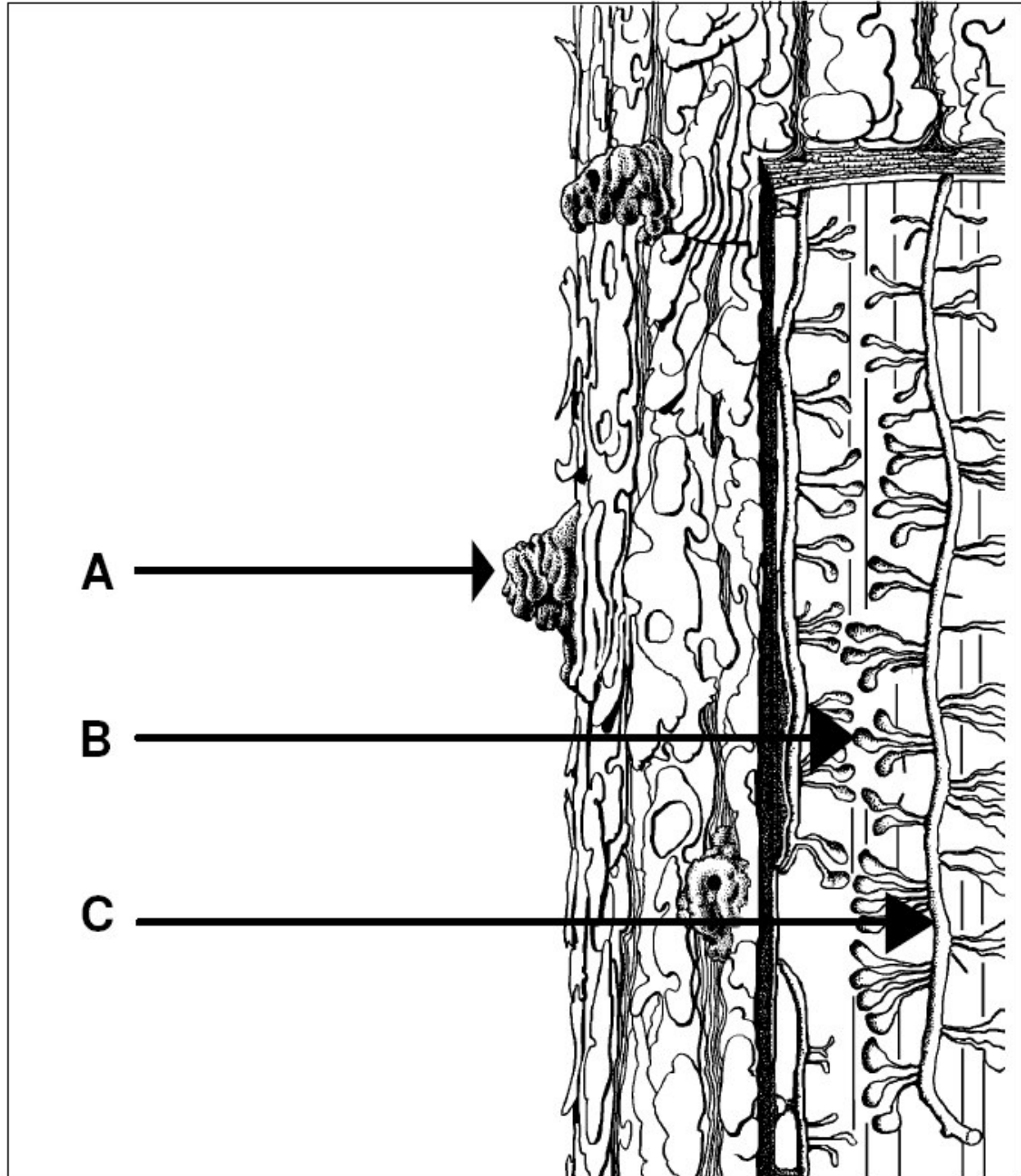


Figure 2. Mountain pine beetle in lodgepole pine

- A - Pitch tube on trunk
- B - Larval gallery
- C - Egg gallery

# MOUNTAIN PINE BEETLE

## Selected References

**Guidelines for reducing losses of lodgepole pine to the mountain pine beetle in unmanaged stands in the Rocky Mountains.**

1977. Gene D. Amman, Mark D. McGregor, Donn B. Cahill, and William H. Klein. USDA Forest Service, General Technical Report INT-36. Intermountain Forest and Range Experiment Station, Ogden, Utah.

**Western Forest Insects.** 1977. R. L. Furniss and V. M. Carolin. USDA Forest Service Miscellaneous Publication N. 1339. Pacific Northwest Forest and Range Experiment Station, Portland, Oregon.

**Management of lodgepole pine to reduce losses from the mountain pine beetle.** 1974. L.

Safranyik, D.M. Shrimpton and H.S. Whitney. Environment Canada, Forestry Service. Pacific Forest Research Centre, Canadian Forestry Service, Victoria, British Columbia.

**Silvicultural and direct control of mountain pine beetle in second-growth ponderosa pine.** 1976.

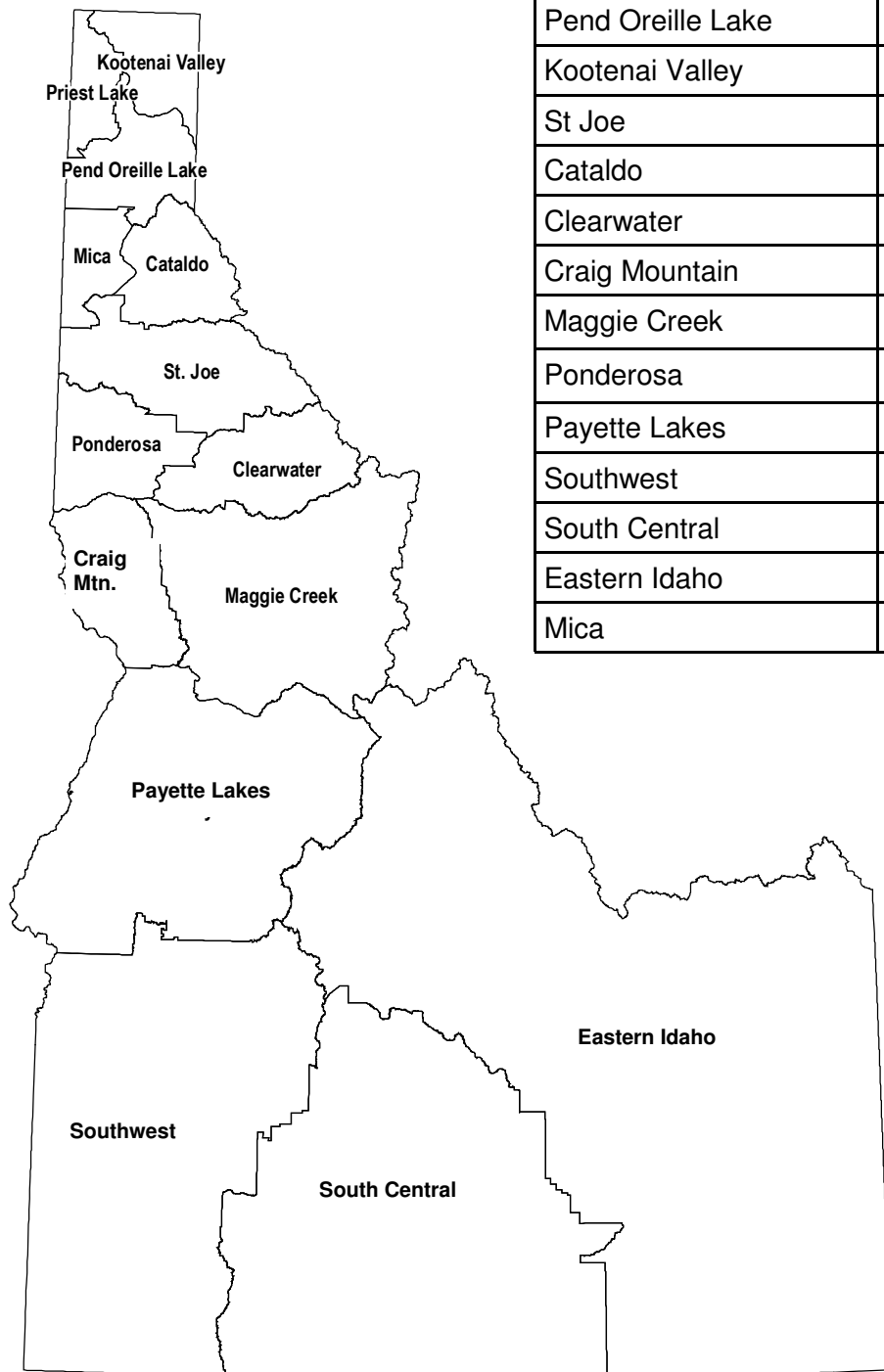
Charles Sartwell and Robert E. Dolf, Jr. USDA Forest Service Research Note PNW-268. Pacific Northwest Forest and Range Experiment Station, Portland, Oregon.

**Integrating Management Strategies for the mountain pine beetle with multiple-resource management of lodgepole pine forests.** 1985.

Mark D. McGregor and Dennis M. Cole. USDA Forest Service, General Technical Report INT-174. Intermountain Forest and Range Experiment Station, Ogden, Utah.



**FOR MORE INFORMATION CONTACT  
ANY IDAHO DEPARTMENT OF LANDS  
PRIVATE FORESTRY SPECIALIST**



Area Office	Location	Phone
Priest Lake	Coolin	(208) 443-2516
Pend Oreille Lake	Sandpoint	(208) 263-5104
Kootenai Valley	Bonn timers Ferry	(208) 267-5577
St Joe	St Maries	(208) 245-4551
Cataldo	Kingston	(208) 682-4611
Clearwater	Orofino	(208) 467-4587
Craig Mountain	Craigmont	(208) 924-5571
Maggie Creek	Kamiah	(208) 935-2141
Ponderosa	Deary	(208) 877-1121
Payette Lakes	McCall	(208) 634-7125
Southwest	Boise	(208) 334-3488
South Central	Gooding	(208) 934-5606
Eastern Idaho	Idaho Falls	(208) 525-7167
Mica	Coeur d'Alene	(208) 769-1577